

MISSOURI resources

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Director's Comment

Cultivating Partnerships

by Scott B. Totten

Farmers, ranchers and landowners – both corporate and private – are improving their agricultural operations. Through cooperation from many sources – Missouri's environment is the better for it.

The Price of Power Energy Market Fuels Cost at Pump

by Kerry Cordray

More than the cost of a barrel of crude goes into establishing the ever-fluctuating price of a gallon of gas – a lot more.

Rock Solid for a Century and a Half

by Joe Gillman, Jim Vandike and Bill Duley

Decades before the word "environment" was used in a meaningful, ecological sense, state geologists were already hard at work surveying, analyzing and documenting the land we call Missouri.

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Resource Honor Roll, Letters,
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Resources to Explore

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State Building Runs on "Star" Power



Above right: Color-coded pipes lead to tanks of various grades of fuel at the Jefferson City Oil Company's storage facility.
Above: A bicycle ride on the Katy Trail provides a good opportunity to take in the fall colors near Rocheport.

Left photo by Scott Meyers



Front Cover: A colorful fall canopy encloses Roby Farm Road in western Boone County.

Back Cover: The State Capitol grounds has several fountains and sculptures, including this figure in The Fountain of the Centaurs.

Cover photos by Scott Myers

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Rock Solid for a Century and a Half

In the mid-1800s when much of the nation was infected with "California gold fever," the people of Missouri were just beginning to explore and map the state's natural resources. There had been no gold strike in Missouri, but our state was the gateway for westward expansion and many people chose to stake their claim in Missouri. It was already known for the fertile agricultural assets of its northern half, the giant springs and forested splendor of its Ozark region, and the rich promise of its lead and iron resources. But for the most part, little else was known about the state's geological, mineralogical and water resources.

"On the 12th day of April last, I had the honor of receiving a Commission from the Governor of Missouri, directing me to make a thorough geological and mineralogical survey of this state," said George C. Swallow in 1853. Missouri's first state geologist, Swallow was further directed "to discover ÷ all beds or deposits of ore, coal, marls and such other mineral substances and mineral waters as may be useful or valuable."

The endeavors of Swallow, with the support of the Missouri Legislature, spawned one of the oldest state agencies in the Midwest ç the Missouri Geological Survey. It is now 150 years old and known as the Geological Survey and Resource Assessment Division (GSRAD) of



By the early 1920s, the Missouri Geological Survey had replaced horses with horsepower. Staff join H.A. Buehler, far right, state geologist from 1908 to 1944. DNR file photo

the Missouri Department of Natural Resources. Although its name has changed several times over the decades, its mission to serve Missouri in the best interests of its citizens has not wavered. Its work has become a foundation for land use and water protection. No other Missouri agency exists that has the in-depth institutional knowledge and fundamental geologic, hydrologic, and geotechnical expertise found in this division.

The Early Years

by Joe Gillman

"During the first few decades of the Survey's existence, geologists had to travel by boat, horseback, train or on foot," said Mimi Garstang, state geologist and director of GSRAD. "Just imagine how you would fare in a largely roadless landscape like the Ozarks of the mid-1800s, if you had to travel by such means, carry all of your gear in saddlebags or a wagon, and explore the geology of rock layers largely hidden beneath your feet." Despite such limitations, a wealth of broad-scale geologic and hydrologic investigations were completed by those early geologists. By the late 1800s, 80 investigations had been completed in 114 counties and the first generalized geologic map of Missouri had been compiled. That map was the foundation for detailed geologic maps that are still being improved as technology allows.

1853 governor's directive to Missouri's first state geologist, George C. Swallow

“to discover ... all beds or deposits of ore, coal, marls and such other mineral substances and mineral waters as may be useful or valuable.”

With an eye toward economic development, the geologists turned their attention to publishing reports on iron, lead and coal deposits, which were vital resources to the early development of Missouri. Those reports provided accurate, fundamental information still used by today's citizens.

By the 1890s, the Missouri General Assembly asked the agency to locate and describe the oil and gas deposits in the northwest portion of the state, as well as iron deposits in the Ozarks. To accomplish this, rock core drilling activities were initiated. The newly emerging drilling technology of the time allowed the Geological Survey to complete one of the deepest test holes in the state. It was drilled to a depth of 2,500 feet to better determine the potential for oil and gas development in Missouri. The project led to a better understanding of the rock units below ground and to the collection of drilling records.

By the 1920s, Missouri geologists had traded in their horses for some of the first automobiles used in state

government. This improved their mobility and made it easier for geological staff to assist the public. It also brought about a new emphasis on quantifying Missouri's water resources. The state's population was growing rapidly, and determining the quantity and quality of the state's surface and groundwater resources was becoming important. Staff geologists and engineers began working closely with towns, businesses and individuals to develop safe water supplies. This was especially important in northwest Missouri where the search for a potable water supply for rural areas was critical. Northwest Missouri is noted for its limited quantities of surface water and its poor quality bedrock aquifers. Test drilling overseen by staff geologists identified the area's ancient buried river channels, which are filled with water-bearing sand and gravel. These have helped alleviate many water shortages in northwest Missouri.



"At the same time that all of this was going on, land surveyors were also busy in our state surveying property and placing markers on the ground for the purpose of agricultural development and property sales," said Mike Flowers, state land surveyor and director of GSRAD's Land Survey Program. "Even though a centralized state effort was not in place in the 1800s, we still rely heavily on the original markers placed (during the) ÷ exploration of the Louisiana Purchase."

Missouri land surveying began in 1815 with the establishment of the 5th Principal Meridian and was followed by dividing Missouri into 2,000 townships, each containing 36 square miles. It was a huge task done largely on foot with steel chains and compasses to measure distances. In 1979, the state's Land Survey Program was officially created within GSRAD to help protect the 250,000 corner monuments set in our state between 1815 and 1855, that legally define property ownership.

New Trends

by Jim Vandike

The latter part of the 20th century marked a definite change in the nation's natural resource focus. In the early 1970s, national environmental awareness was instrumental in creating new laws crafted to clean up our waterways and deal with emerging environmental problems.

The Missouri Department of Natural Resources was created in 1974 and the Missouri Geological Survey and Water Resources agency, as the Survey was then known, became a division of the department. The longevity and experienced technical background of the

geologists and hydrologists at the Survey provided a strong foundation for the department's newly formed regulatory programs dealing with difficult land and water issues. Groundwater and surface water protection emerged as a major environmental priority for the department. Almost all of the work currently completed in this division relates directly to ensuring that Missourians have an ample supply of high-quality water and protecting water resources for future water needs.

"Today, the division collects, analyzes, and distributes many types of information to anyone in need of sound hydrologic, geologic, survey and geotechnical data," said GSRAD Director Garstang. "Identifying and mapping areas of the state that are at risk from geologic hazards such as earthquakes, underground mines, landslides and sinkholes so construction and development costs can be better managed are some of the applications for these maps."

The proper construction of water wells is critical to protecting the health of Missourians. The division's Wellhead Protection Section regulates private well drillers and certifies the proper construction of wells.

"The (section) has made huge progress in the effort to inform the public that wells must be properly constructed to protect our health and the quality of our groundwater resources," said Steve Sturgess, director of the Geological Survey Program. The subsurface data the division manages assists the drilling industry in estimating well costs and determining the proper depth from which to produce good water.



The division has excelled during the past 50 years in defending and protecting Missouri's river resources. Missouri currently is facing a time where the rights to its water resources are being threatened by neighboring states, mostly in the upper Missouri River basin. Certain regional groundwater supplies also are being depleted by heavy use.

Dam and reservoir safety also is a matter of much concern to Missourians. In 1979, the Missouri General Assembly created the Dam and Reservoir Safety Program and placed it within the division to protect people from unsafe dams. All non-federal dams in Missouri that are at least 35 feet tall now are regularly inspected, and the construction of new dams is monitored by division engineers.

Looking to the Future

by Bill Duley

To mark the division's 150 years of service, a new state geologic map of Missouri will be released at the end of this year using Geographic Information System (GIS) technology.

"Fifteen decades may have passed since George Swallow made the first generalized geologic map of Missouri, but the demand for increasingly more detailed information grows every year because of land and water use demands," said Mark Middendorf, the geologist who leads the division's mapping efforts. "Swallow would be astonished at what we can do today to improve the accuracy and usability of geologic maps."



One of 70 groundwater monitoring stations across Missouri returns data via satellite every four hours. The data is available on the department's Web site at [www.dnr.mo.gov/water.htm].
DNR photo by Jim Vandike

The division currently is preparing to release an electronic atlas stored on CD-ROM, containing more than 15 statewide digital GIS map coverages. The Missouri Environmental Geology Atlas, or MEGA as the geologists call it, will put a lot of natural resource information into the hands of the public so people can make better informed environmental and development decisions.

"By using this GIS technology, hydrology and geology will progress to a new level of visualization, allowing us to more accurately model earthquakes, water shortages and contaminant migration to better prepare for the future," said GSRAD Director Garstang.

From horseback to satellite, the Geological Survey and Resource Assessment Division is looking forward to another 150 years of service to the citizens of Missouri. As technology evolves, so does the division. By applying the data that the division has collected and analyzed to solve real world problems, the tradition of the Missouri Geological Survey is a huge success story for our state. The continuation of this tradition and success will benefit all Missourians.

"It is crucial that data move out of the filing cabinets and into hands of the people as we continue to serve in the new millennium," said Garstang. "Geologic and hydrologic information isn't just about rocks and water. It is about people and the way that people interact with their natural resources. We must not take our natural resources for

granted."

Mimi Garstang Director, Geological Survey and Resource Assessment Division

“Identifying and mapping areas of the state that are at risk from geologic hazards such as earthquakes, underground mines, landslides and sinkholes so construction and development costs can be better managed ...”

The Geological Survey and Resource Assessment Division will be hosting an open house at its Rolla headquarters in the fall of 2003 so the public can better understand the projects and responsibilities of the division and help celebrate 150 years of outstanding service.

Joe Gillman is chief of the Environmental Assistance Unit and a geologist, Jim Vandike is a section chief and geologist, and Bill Duley is deputy director and assistant state geologist for the department's [Geological Survey and Resource Assessment Division](#). Denise Becker, the division's information officer and Dwight Weaver former division information officer, assisted with this feature.



Director's Comment

I really enjoyed getting to meet and talk to so many of you at the State Fair in Sedalia. Many people asked us about why we cut back on our hours, exhibits and information on Missouri's natural resources this year.

Most of you know that the State of Missouri is in tough budget times. We have faced many difficult decisions in the past few months. We've lost 54 positions, and we've closed a regional office. The department has sustained a 65 percent cut to general revenue funds appropriated to the department since fiscal year 2001. We cannot incur such a drastic cut and continue to operate as we have in the past.



Governing Magazine recently published a report that showed Missouri ranked 50th, for the second year in a row, on environmental funding. The Department of Natural Resources total remaining general revenue budget for fiscal year 2004 is \$8,936,771. This sounds like a great deal of money. But I want to take it a step further and divide it by 5.6 million. Then we have a much smaller number of \$1.60. The 5.6 million represents the number of Missouri citizens; this means that you, as a taxpayer, pay less to have clean air, clean drinking water and a productive environment than you do for a meal at your local fast food chain.

We've managed to do quite a bit with that \$1.60. Whose responsibility is it to fund a clean environment for us? Should industry pay or do we all benefit? We have looked, and continue to look very carefully, at our priorities to determine how we could continue to fulfill the mission of the department on an ever-shrinking budget.

We are working with Missouri citizens, organizations and industry to identify how we can find support for Missouri's environment. However, the budget forecast for fiscal year 2005 is even more dismal than it was for fiscal year 2004. There will be impacts to the services we provide. In the past, we've always been able to do more with less. Those days are gone. We must now face the fact that we will have to do less because we have fewer resources.

We will continue to define how we do our core business to protect

Missouri's environment and to chart our course for the future. Our services and activities that help us communicate better with Missourians or activities that are statutorily required will remain our priorities.

"Integrity and excellence in all we do" is more than just a slogan for us; it's the standard I use to guide this agency forward every day. Our approach is simple: Continue to work hard to protect our state's air, land and water quality, look for ways to support our state's economic growth and development and provide excellent customer service to the constituents we serve. We're still doing the job you've asked us to do.

As my uncle Yogi Berra once said, "The future ain't what it used to be." Thank you for your continued support as we move ahead into a future very different from what we've faced before. And think for a moment, aren't your natural resources more lasting and fulfilling than a fast food meal?



It's Not PC ... to Trash PCs

Personal computers have become faster and cheaper. Owners are looking for clear options when it's time to replace their old one. The Missouri Department of Natural Resources has launched a Web page at [www.dnr.mo.gov/alpd/swmp/rrr/computerlist.htm] to help people and businesses find a place for their retired computers. It includes a list of Missouri computer recyclers and guidance for those who own, collect, transport or recycle electronics.



Many parts of a computer system can be demanufactured, then reused or resold. Monitors, however, present a hazardous disposal problem as they may contain several pounds of lead. This adds cost to recycling them and presents risks to human health and the environment if improperly disposed. Businesses must determine if the computers they are ready to discard require special handling due to hazardous materials. Individuals may still, legally, throw theirs away, but this presents the health risks mentioned above. Reuse or recycling is a cost-effective alternative.

Statistics show that half of all Americans own a computer. The average life of your PC is only two years. Between 1997 and 2007, 500 million computers will become obsolete - 60 million in 2003 alone. Seventy-five percent of obsolete computers are in storage. Electronic waste comprises 70 percent of all heavy metals deposited in the nation's landfills, and worse, half of what we generate is exported.

Some retailers take trade-ins or may take back computer components for a fee. Groups working within Missouri's [20 Solid Waste Management Districts](#) may host E-waste collection events. Contact your local district office if you are interested in this option. For

more information on residential electronic waste, call 800-361-4827 or (573) 751-5401.
For electronic waste from businesses call (573) 751-3176.



Letters

I just read the article in *Missouri Resources* about the Lake of the Ozarks State Park and how it came to be such a nice place. That your magazine gave credit to the CCC companies for doing much of the work to get the park up and running was gratifying to me. I was a member of Co. 1756, one of the companies that did the work of building those roads and shelters. While my assignment to work in the field was brief, I know a lot of hard work was done by young men getting \$1 a day plus keep. Each month, \$22 were sent home - we got to keep \$8 for ourselves.

I remember seeing an old news program on TV where Will Rodgers was very critical of the CCC. "Roosevelt's Tree Planters," he referred to us as. Well, those trees planted by guys getting a buck a day are now 65-70 years old and are a valuable forest resource today.

The CCC was a program that worked - those hard-surfaced roads were hacked out with picks and shovels, gravel screened by hand and sometimes there was help with a beat-up road grader pulled by a Caterpillar on its last treads. Being a member of Co. 1756 was one of the best times of my life. Friendships still exist with guys of that time. There were many success stories from members of our company who served with honor and valor in WW II, and then came home to begin successful careers.

Again, thanks for giving us some credit. Maybe a future issue article could be done in depth about the CCC - a true national and "Missouri resource."

Charles L. Klein
Arnold

Editor's Notes:

We saluted the CCC in an MR feature 10 years ago this issue. The Fall 1993 story was entitled, "The Tree Soldiers." We are sending you five copies to share with others you possibly still correspond with from Co. 1756.

Several readers wrote and e-mailed with a question about the Teacher's Notebook article written by Jim Lubbers in our Spring/Summer issue. Most wondered if one barrel (42 gallons) of crude oil only yielded 2.5 quarts of motor oil, what happens to the rest of the barrel? See our Winter 2004 issue's Environmental Notes for the answer to this question.

Letters intended for publication should be addressed to "Letters," *Missouri Resources*, P.O. Box 176, Jefferson City, MO 65102-0176 or faxed to (573) 751-8084, attention: "Letters." Please include your name, address and daytime phone number. Space may require us to edit your letter. You also can e-mail *Missouri Resources* staff at moresdnr@mail.dnr.state.mo.us

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News Briefs



Department Grant Fights Pollution

The Missouri Department of Natural Resources has awarded a \$187,317 grant to the University of Missouri-Columbia for a demonstration project involving irrigation and nitrogen management systems. The Team Up project aims to address nonpoint source water pollution issues around the state. Nonpoint source pollution occurs when pollution is released from many locations, making it difficult to identify and control. Storm-water runoff, snowmelt and irrigation can carry pollutants into nearby waters.

The Team Up demonstration project's goal is to reduce nitrate use and protect groundwater in the major irrigation areas of Missouri. Farmers in Atchison, Holt, Vernon, Barton, Jasper, Newton, Dade, Boone, Callaway, Audrain, Butler, Dunklin, Pemiscot, New Madrid, Stoddard, Mississippi, Scott, and Cape Girardeau counties will participate in the program. Those counties account for more than 90 percent of the irrigated acreage in Missouri.

High-use nitrogen crops such as corn, watermelons and potatoes are often planted in sandy-type soils that tend to leach contaminants. The combination makes groundwater susceptible to pollution. The Team Up project seeks to balance water and nitrogen use to ensure the best yields and limit deep percolation of nitrogen.

The Department of Natural Resources, Missouri University Outreach and Extension, the Natural Resources Conservation Service and certain soil and water conservation districts will work with farmers to teach them best management practices that will protect the environment and improve their bottom line.

The Team Up project is funded by a section 319 grant from the U.S. Environmental Protection Agency Region VII and is administered through the department. For more information about the Team Up project, contact Tod Hudson with the department's [Water Pollution Control Program](#) at (573) 751-8728.



Surf the Web; Clean a Stream

A recently launched high-tech fundraising effort offers a quick and easy way to support the environment. Stream Team is a volunteer organization that works on water-related protection activities. Their version of cyber-shopping works like this: Any time you want to make an online purchase, go to the Shopping Mall on the Stream Team Web site at [www.mostreamteam.org]. Visit any of those stores by using the link from the Stream Team site. When you make a purchase, a percentage of the sale will be donated to the group. Best of all, it doesn't cost you anything extra. The merchants cover the cost of the contribution. Funds from the site will be used to purchase water-quality testing kits, trash bags, leather gloves, first aid kits and other items that volunteers regularly use to monitor and clean up rivers and streams across the state. The Stream Team program is sponsored by the Missouri Department of Natural Resources, the Missouri Department of Conservation, and the Conservation Federation of Missouri.



Waste Tire Fee Not Renewed

What can 50 cents buy you today? Your first thought is probably not much. However, with the money collected from a 50-cents-per-tire waste tire fee,

the Department of Natural Resources is able to clean up and recycle waste tires in Missouri. The department collects approximately \$2.5 million annually when new tires are purchased.

The 50-cent waste tire fee is a small price with large rewards when used to eliminate waste tire dumps. More than 11 million tires within 348 illegal dump sites have been cleaned up from Missouri's fields, roadsides and communities. There are still at least 3.3 million known waste tires to be cleaned up.

When disposed and recycled properly, waste tires provide a beneficial use for tire-derived fuel, generating electricity, creating new tires, playground surfaces and other new products.

When waste tires are not disposed or recycled properly, they pose serious threats to human health and the environment. Water sitting in waste tires creates an ideal environment for mosquitoes, heightening the threat of the dangerous West Nile Virus. Fires from waste tires release hazardous substances into the air and possibly into groundwater sources. Tire pile fires can burn for months or even years.

The waste tire fee was not extended during the regular 2003 legislative session and is set to expire on Jan. 1, 2004. When similar programs in Texas and Wisconsin expired, illegal dump sites increased.

For more information, contact the Department of Natural Resources' [Solid Waste Management Program](#) at 1-800-361-4827 or (573) 751-5401.



New Trail Opens at Morris State Park

A new trail providing access to [Morris State Park](#) near Campbell is now open to the general public, the Missouri Department of Natural Resources announced.

The 2-mile Beech Tree Trail allows visitors to experience a unique part of Missouri known as Crowley's Ridge. The 161-acre Morris State Park preserves a portion of this ridge, which is a natural range of low hills in the state's

Bootheel area. The uniqueness of the region and the unusual soil types provide a home for more than 300 different types of plants, a few of which are native in Missouri only to Crowley's Ridge. On the trail, visitors can expect to see trees such as American beech, tulip poplar and sweet gum, along with plants such as red buckeye, Hercules club and white mountain mist. The trailhead features a parking area, restroom, water, and an accessible walkway that leads to an overlook.

The park, which was donated by Jim Morris of Springfield, is still under development. Interpretive panels and a self-guiding trail brochure are being created to explain the significance of the area. Once this interpretation is completed, there will be an official grand opening for the park.



Birds Are Focus of Initiative

Natural habitats for birds are becoming more and more limited, causing a decline in the population of some bird species. In Missouri, 26 percent of bird species showed declining trends from 1980 to 2000. Grassland and forest interior birds are examples of groups that are facing serious declines because of loss of habitat.

Because of these declines, 20 organizations have signed a voluntary agreement to join the Missouri Bird Conservation Initiative (MoBCI) to coordinate efforts to conserve all bird species. The agreement includes both public and private organizations, including Ducks Unlimited, Missouri Audubon, Webster Groves Nature Society, Quail Unlimited, Missouri Department of Natural Resources, Missouri Department of Conservation, U.S. Fish and Wildlife Service and the U.S. Forest Service. The group works together to conserve and restore bird populations and habitat.

Because of the many different habitats they preserve, Missouri state parks are great places to observe many species of birds. Habitats range from the wetlands at [Big Oak Tree State Park](#) and [Pershing State Park](#) to tallgrass prairie landscapes at [Prairie State Park](#).

The department also has an agreement with Missouri Audubon Society to facilitate bird surveys in six state parks and maintain a database. Naturalists at some state parks also do bird counts on their own and keep lists of birds spotted by visitors.

For more information on Missouri state parks or the Missouri Bird Conservation Initiative, visit state park's Web site at [www.mostateparks.com].



Time Running Out On Haz Waste Fees

With adequate funding, the Missouri Department of Natural Resources is able to protect Missouri's citizens and land resources through proper management of hazardous waste. That funding is at risk if the hazardous waste fees bill is not extended past Jan. 1, 2005.

The fees bill requires nearly 3,000 generators of hazardous waste to continue to pay for their share of the state's oversight costs. The department uses these funds to ensure responsible management during generation and handling of hazardous waste, cleanup of existing contamination, hazardous substance spills and releases, and threats to homeland security.

Each year, the U.S. Environmental Protection Agency (EPA) provides nearly \$5 million dollars to the department's [Hazardous Waste Program](#) when matching dollars are generated from the hazardous waste fees. Without them, EPA could not provide funding.

This partnership between EPA and Missouri has ensured quality cleanups of contaminated soil and groundwater and supports local emergency response and law enforcement through environmental emergency response and meth lab waste disposal. EPA and the department work in concert with the industry to provide workable, commonsense solutions to the challenges of safe handling and cleanup of hazardous waste and hazardous substances.

Without adequate funding, the state's ability to accomplish these goals will be seriously impaired and likely unable to maintain many of the programs and services currently provided to Missouri businesses and citizens.

For more information, contact the department's Hazardous Waste Program at 1-800-361-4827 or (573) 751-3176.

Holden Appoints Two to Board

Gov. Bob Holden recently appointed two board members to the Environmental Improvement and Energy Resources Authority (EI ERA). The EI ERA finances energy and environmental projects for the State of Missouri.

Jerry Govero is a developer and engineer for Govero Land Services in Festus and has been involved in the planning and development of 10 residential communities. He earned a bachelor's degree in mechanical engineering from the University of Missouri-Rolla, and is a member of the Missouri Society of Professional Engineers and the Home Builders Association of Greater St. Louis. Also, Govero served as a first lieutenant in the U.S. Army Corps of Engineers as a combat engineer.

In 1995, Darwin Hindman was elected mayor of Columbia and currently is serving his third term. He practices law at the Columbia firm of Hindman and Goldstein. Hindman is president of the Missouri Rails to Trails Foundation and is a former member of the Missouri Economic Development Finance Board and Missouri State Parks Advisory Board. Hindman earned his bachelor's and law degrees from the University of Missouri-Columbia, and served two tours of active duty as an Air Force pilot.



Environmental Excellence Award Winners Named

The 2003 Governor's Environmental Excellence and Pollution Prevention Award Winners have been named. Missouri Department of Natural Resources Director Steve Mahfood announced the recipients at the Environmental Conference at the Lake of the Ozarks. Winners from nine categories are chosen with an overall statewide winner selected from the group. The awards are sponsored by the Department of Natural Resources, Missouri Chamber of Commerce and Bridging the Gap.

The overall statewide winner was Empire District Electric Company's Asbury Power Plant in Joplin. The firm also was the winner of both the Pollution Prevention and Recycling categories. The Asbury plant voluntarily began using Tire Derived Fuel (TDF) in its electric generation plant in 2003. The TDF program was developed in cooperation with the department and the Kansas Department of Health and the Environment to remove waste tires from the environment and recycle them.

In April 2003, the City of Joplin partnered with Empire to hold its first tire collection. Removing scrap tires and using them for fuel reduces mosquito breeding habitat, saves landfill space, cuts fossil fuel use and air pollution emissions.

The remaining categories and their winners are: Energy Efficiency - Linn State Technical College, Linn, for a new Information Technology Center that has enjoyed reduced operating energy costs that range from 49 percent to 62 percent over the two years since completion. The new building also won the Technology Innovation category; Environmental Management - Washington University School of Medicine, St. Louis, for an environmental management system initiative that studies "consensus best practices" for managing hazardous waste materials in major academic research institutions; Technical Assistance Provider - White River Valley Environmental Services LLC, Branson, an electric cooperative that provided technical assistance to cities, sewer districts, developers and individuals on new technologies for wastewater treatment in the White River, Table Rock and Bull Creek watersheds; Land Use - Environmental Resources Coalition, Jefferson City, which found solutions to agricultural pollution problems that benefited the environment without hampering farmers' profits; Market Development - Lafarge North America, Sugar Creek, for dedicating staff to finding environmentally safe but effective alternative fuels for its cement plants as well as research toward future alternative fuels that take advantage of modern manufacturing by-products, and; Education and Outreach - East-West Gateway Coordinating Council's Regional Water Resources Advisory Council, St. Louis, for developing and distributing effective materials, workshops and assistance to St. Louis metro area citizens, elected officials and technical staff on a wide range of water-related issues including Phase II storm water permit applications.



Governor Receives Energy Council Recommendations

The Governor's Energy Policy Council recently presented recommendations to Missouri Gov. Bob Holden for helping to ensure adequate energy supplies for Missourians. The Council's report focused largely on Missouri's use of energy sources from outside the state. According to the report, in 2000, Missouri imported more than 95 percent of its energy sources in the form of coal, petroleum and natural gas, and spent \$13.2 billion on its energy needs. The council found that energy efficiency and the development and use of Missouri's renewable energy resources offer economic benefits to Missouri, and recommended that these should be fundamental components of the state's plan.

"The council's findings are significant," Holden said. "Its recommendations could help Missourians keep billions of energy dollars here in Missouri. Currently, many dollars leave our state to buy energy sources that we import."

The council also looked at ways that state government could serve as a leader in energy-efficiency efforts. According to the report, state agencies, including universities, spend about \$78 million for energy use in state facilities. If this energy bill were reduced just 10 percent, savings to the state would be \$7.8 million per year.

The council also looked at the Federal Energy Regulatory Commission's (FERC) Notice of Proposed Rule Making for Standard Market Design. The purpose of this proposed rule is to ensure better competition in wholesale electricity markets and open access to transmission lines. The council recommended that FERC take ample time to evaluate the rule. It also recommended that Missouri take the position that its citizens should not be adversely affected in higher rates or service.

A copy of the Governor's Energy Policy Council Report is available on the Department of Natural Resources' Web site at [<http://www.dnr.mo.gov/oac/EnergyPolicyCouncilreport.pdf>].

Mahfood Accepts EPA Appointment

Christine Whitman, former administrator of the U.S. Environmental Protection Agency (EPA), has appointed Missouri Natural Resources Director Steve Mahfood as chairman of the U.S. Governmental Advisory Committee to the North American Free Trade Agreement Commission on Environmental Cooperation.

Whitman made the appointment prior to her June 2003 resignation. The committee provides recommendations to help assure that state, local and tribal governments are represented in the development of U.S. policy related to environmental agreements made to NAFTA.

"Steve is uniquely qualified to serve as a committee advisor because of his experience in finance and trade issues, his background in research and development of environmental and economic policies and his education," said Oscar Carrillo, the designated federal officer for the Governmental Advisory Committee, run by EPA.

Mahfood has served as director of the Missouri Department of Natural Resources since 1998. He is responsible for developing and implementing policy to protect Missouri's environment, natural and cultural resources. Mahfood also oversees statewide activities in the areas of air, land, water, energy and cultural preservation.

"Steve has guided the Department of Natural Resources to a more public-oriented, inclusive approach in accomplishing our mission," Gov. Bob Holden said. "He has reoriented and restructured the department to respond to 21st century issues and enhanced economic opportunities in Missouri, without compromising Missouri's environmental quality," he added.

Mahfood represents the State of Missouri on the Environmental Council of the States, the Missouri and Upper Mississippi River Basin Associations, the Mississippi River / Gulf of Mexico Watershed Nutrient Task Force and the EPA's Environmental Financial Advisory Board. He also serves on the Environmental Financial Advisory Board's International Committee.

"My background includes serving internationally in the Middle East and in North Africa, with Project Hope and CARE, and as director of environmental finance for Missouri," Mahfood said.

Prior to his appointment as director of the Department of Natural Resources by the late Gov. Mel Carnahan and reappointment by Gov. Holden, Mahfood led Missouri's Environmental Improvement and Energy Resources Authority, a financing and research arm of the department.

For news releases on the Web, visit [www.dnr.mo.gov/newsrel/nr_list.htm].

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One Last Word



In kindergarten, working well with others and meeting goals will earn a student a gold star.

For the Department of Natural Resources and its partner, the Jefferson City property management company, P&G Development, improving the energy efficiency of one of the department's office

buildings resulted not in a gold star, but an ENERGY STAR®. (See more on ENERGY STAR in our Summer 2002 issue.)

The ENERGY STAR designation, a joint program of the U.S. Department of Energy and the U.S. Environmental Protection Agency, recognizes the department's office building at 1659 E. Elm, Jefferson City, as being among the top in energy efficiency in the nation. With an efficiency ratio of 89, the 24-year-old building falls in the top 11 percent of similar buildings in Jefferson City's climate zone, actually surpassing the Energy Star threshold for our area.

By installing a ground-source heat pump and other components of a higher-efficiency heating, ventilation and air conditioning system, high-efficiency light fixtures, motion sensor controls and high-efficiency office equipment, the department realized a drop in energy costs from \$2.12 per square foot to \$0.74 per square foot. This translates into energy savings of \$55,000 annually, a rate of savings that will pay for the initial investment in 11 years.

The decreased demand for energy has not only cut the department's electric bill, it has also eliminated more than 3 million pounds of carbon dioxide, sulfur dioxide and oxides of nitrogen that otherwise would have been released into the air. This helps the

department succeeds in its mission to protect our natural resources, while also meeting its responsibility to taxpayers to achieve its mission in a cost-effective way.

However, this exercise goes beyond the department's mission and responsibilities. Using the Elm Street building as a model, government agencies at every level can undertake efforts to make their own buildings more energy efficient, or work with building owners to do so. Energy-efficiency investments definitely pay for themselves in the long run.



An insulating earthen berm and roof overhang that shades windows from summer sun are two of the design features that improve the energy efficiency of the Department of Natural Resources offices at 1659 E. Elm in Jefferson City. An upgrade of the building's heating, ventilation and air conditioning systems, light fixtures and office machinery, helped it earn designation as an Energy Star® building.

These concepts also can translate into new construction. Site

preparation for the department's new office building in Jefferson City is underway. This "green building" has been designed using off-the-shelf concepts and technologies to make it a case study in efficiency. More on the department's green building, currently under construction, was published in the [Fall 2002 Missouri Resources](#).

Because of improved technologies and the rising price of energy, programs like ENERGY STAR and projects like the department's Elm Street offices and green building have shown that the gap between environmental stewardship and fiscal responsibility has been bridged. As consumers and decision makers, it is time that we take this bridge every time the opportunity arises. There are plenty of gold stars to go around.

Larry Archer is a public information coordinator with the department's [Outreach and Assistance Center](#).



Cultivating Partnerships

by Scott B. Totten
photographs by Scott Myers

Plant, cultivate, harvest. Of course, it is not nearly that simple. But all across Missouri, and more so every day, farmers and ranchers, individual and corporate, are harvesting the rewards of behind-the-scenes support. Support from natural resource commissions, soil and water districts, local, state and federal government, and a host of tireless individuals who bring them all together make it happen - in every county in Missouri. The rewards of these partnerships improve the quality of their agricultural operations and protect Missouri's environment.

The quality, quantity and usability of the natural resources essential to ag producers in our state are improving every day. It's the people who tirelessly work together to apply them who are helping every Missourian reap the benefits.



Agricultural field days, like this one in Bates County, provide an opportunity to see the latest in farming practices and technologies.

Most of Missouri's 109,000 farms have little or no contact with the regulatory side of the Missouri Department of Natural Resources. They raise their crops and livestock without realizing that protecting the water their animals drink and helping reduce erosion from their lands are major activities of the department.

The department's Outreach and Assistance Center, through the [Environmental Assistance Office \(EAO\)](#), provides assistance to agriculture by explaining environmental protection needs and requirements, assisting with problems or emergencies, identifying other sources of technical or financial assistance, and arranging on-site assistance to solve problems.

The EAO provides livestock producers with assistance in initiating a permit, Letter of Approval, or financial assistance application. For agricultural chemical facilities, EAO provides training and pollution prevention manuals and explains compliance requirements for risk management planning and secondary containment for chemical dealerships. The office also assists with manure management plans, works with the Natural Resource Conservation Service (NRCS) and University of Missouri on computer-based manure management planning and assists the University Extension with pesticide applicator training and certification.

The Department's [Soil and Water Conservation Program](#) (SWCP) distributes funds from the one-tenth-of-one-percent parks and soils sales tax to help local landowners reduce erosion on their lands. Cost-share funding is provided to landowners for up to 75 percent of the cost of installing soil conservation Best Management Practices (BMPs). These save the soil and protect local water supplies from sediment and contaminants. Soils sales tax funds are distributed to landowners through each of the 114 local soil and water

conservation district boards, providing for staff and local programs that address county-specific problems. NRCS staff in each district ensure that cost-share practices are properly designed, implemented and maintained.



Some of the newer agricultural practices that benefit both farmers and the environment are management-intensive grazing and animal waste management systems. DNR photo by Scott Myers

Special Area Land Treatment (SALT)

grants provide funding to local watersheds for project planning, management and technical support, cost-share and loan-interest-share incentives to install control practices that improve the farming operations and benefit water quality.

Just such a SALT project is in Osage County. Each year, more than 1.6 million turkeys are produced on 58,000 acres of the Loose Creek watershed. The district received a federal [Clean Water Act Section 319 grant](#) from the department's [Water Pollution Control Program](#) to

control nutrients from the land application of turkey litter. Landowners borrowed district-purchased manure-handling equipment for waste management. The pilot farms then demonstrated nutrient BMPs with the new methods to their neighbors. In 1998, the district received a SALT grant to provide 75 percent cost-share funding for the BMPs.

Today, in the Loose Creek Watershed, there are 16 stackhouse-composters to handle turkey litter. Annually, more than 6,200 acres have been enrolled in the waste plan, and more than 4,000 tons of waste now are managed this way. The 319 and Agricultural Nonpoint SALT grants have reduced phosphorus and nitrogen loading to the watershed.

The benefits of improved waste handling extend across the state through improved surface and drinking water quality for everyone. Livestock producers with more than 1,000 cattle, 700 dairy cattle, 2,500 swine (more than 55 lbs.), 55,000 turkeys, 30,000 broilers, 125,000 chickens, 1,000 veal calves, 500 horses, 30,000 ducks, 10,000 sheep, or 82,000 laying hens must apply for Concentrated Animal Feeding Operations (CAFOs) construction and operation permits. Currently, approximately 450 CAFOs are permitted (50 smaller operations also have permits). The effect is improved water quality for neighbors and downstream landowners. CAFO owners also benefit from the fertilizer value of manure.

Approximately 3,700 smaller livestock farms have benefited from voluntary Letters of Approval (LOAs). Since the early 1970s, an engineering review has been provided by the department as a

free service to agricultural producers. Many Missouri banks ask that smaller producers receive an LOA from the department before a construction loan will be approved. This review provides owners and lenders with assurance that the manure management system has been properly designed and constructed.



Some of the newer agricultural practices that benefit both farmers and the environment are management-intensive grazing (above) and animal waste management systems. DNR photos by Scott Myers

The department's Water Pollution Control Program (WPCP) administers the U.S.

Environmental Protection Agency's (EPA) 319 Nonpoint Source Grants for education, demonstration and restoration projects. Since 1993, the department has issued over \$16 million in 319 grants.

Raccoon Creek, located in Grundy and Daviess counties in northwest Missouri, has a watershed of about 15,000 acres - 10,000 of which are cropland, 1,500 in pasture, and the rest wildlife habitat, roads and public use areas. Water quality is critical to landowners there. Raccoon Creek is a subwatershed of the Sugar Creek watershed, which has an active Ag Nonpoint SALT project. The watershed, through the Grundy Soil and Water Conservation District (SWCD), received a federal 319 grant. The money was awarded to the Daviess and Harrison county SWCDs to improve water quality and prevent nonpoint source water pollution there.

The project manager works to speed up BMPs for water protection and soil conservation, and coordinate efforts between the SWCDs and the Department of Natural Resources, the NRCS, the Department of Conservation, University of Missouri Outreach and Extension, Vo-Ag and science instructors, schools, the local radio station, and chem-ag and implement dealers, who all help.

The WPCP also provides the Missouri Department of Agriculture with funds for low-interest loans through the Missouri Agricultural and Small Business Development Authority. That group makes low-interest loans for smaller producers to construct manure management systems.

Groups such as Mo-Ag Industries Council and the Missouri Corn Growers Association have voluntarily assisted with projects to reduce ag chemical runoff into drinking water supplies. Education programs for crop producers and ag chemical suppliers, pesticide container recycling, workshops on pesticide application and one-on-one assistance with crop producers have heightened awareness of BMPs.

Rural water districts are the source of drinking water for many farms in much of northern Missouri. The department regulates the construction and monitoring of all public water supplies to assure safe drinking water. MoDNR's Public Drinking Water Program also provides funding for rural water districts through the Water and Sewer Grant Program and the State Revolving Fund (SRF).

The [Public Drinking Water Program](#) also tracks drinking water contaminants as required by the federal Safe Drinking Water Act. Many of these potential contaminants are agricultural. Systems that use lakes or rivers for drinking water often are vulnerable to sediment, excess nutrients and pesticides that wash off farmland and into watersheds. The program assists communities with voluntary watershed protection plans and issues grants to public water supplies that participate in the Conservation Reserve Enhancement Program. A joint effort of several state agencies and the U.S. Department of Agriculture, the program retires cropland in drinking water watersheds for 15 years.

The Public Drinking Water Program has sought to locate sites where any of 50 farm chemicals have been manufactured, stored, used or disposed of. One of the many sources for this information is provided by the Missouri Department of Agriculture. The program also locates information on grain bin contamination sources from that agency, other Department of Natural Resources programs, and the EPA. The department makes the data available to those who request it.

If elevated levels of ag chemicals are detected in public drinking water sources, department regional office staff help investigate the cause. If an improper application of pesticides is the cause, the Missouri Department of Agriculture is called in.

The department's [Land Reclamation Program](#) advises landowners on proper gravel removal techniques to help protect their streambeds, and provides technical assistance to landowners of abandoned mine lands.

Small farms are exempt from virtually all of the department's [Air Pollution Control Program](#) (APCP) regulations. In the St. Louis area, agricultural open burning for weed or pest control between April 15 and Sept. 15 only requires notification of the APCP director.

The department's [Hazardous Waste Program](#) regulates very few farms in Missouri. Farmers are exempt for pesticide disposal if they triple rinse the container and dispose of the residues according to label instructions. Fewer than 50 farms have enough on-site motor fuel to require storage or handling regulation. Farms that generate an annual average of 25 gallons of used oil a month or less also are exempt from used

oil regulations, although proper disposal is still required.

The department's [Solid Waste Management Program \(SWMP\)](#) enforces proper use of solid wastes in normal farming operations as long as public health is not affected. This generally applies to waste materials generated and used as soil amendments.

The Missouri [Solid Waste Management Law](#) allows for the use of up to 100 waste tires for soil erosion abatement and drainage purposes, or to secure covers over silage, hay, straw or agricultural products, or for other uses. Tire piles, however, are not permitted on farms.



Field day participants examine a rock chute used to stabilize a stream bank and minimize erosion.

The department's [Energy Center](#) has been providing support for the development of ethanol markets in Missouri for many years. Through the Outreach and Assistance Center, it also supports research for use of crop and forest residues in energy production and to replace fossil fuel-derived products. Biomass energy production and use provides both environmental benefits and new income streams.

The department's [Geological Survey and Resource Assessment Division \(GSRAD\)](#) provides geological evaluations of sites proposed for animal waste facilities of all sizes, at no cost to those seeking LOAs or permits. GSRAD's Wellhead Protection Section regulates water well drillers and assists well owners in assuring proper well construction. The division works to protect the water quality of Missouri's aquifers. Technical assistance for the plugging of abandoned wells and cisterns also is provided. Besides the potential water-quality problems they can cause for surrounding surface and groundwater sources, unplugged, abandoned wells have also proven to be a safety liability to farmers and ranchers.

GSRAD's Major Water Users Unit registers major water users and collects water-use information from them. It monitors both surface and groundwater users with the capacity to produce at least 100,000 gallons per day.

Missouri's use of its namesake river is zealously defended by GSRAD. Northern river basin states, some federal agencies, and interest groups are seeking to eliminate lower river navigation support and reduce spring flood control capacity of the river. Both of these initiatives will harm Missouri agriculture. The division partners with the Missouri Department of Agriculture, the Missouri Farm Bureau, the Missouri Levee and Drainage District Association and others to contract studies to evaluate the impacts of the so-called "spring rise" on Missouri River bottomlands. The studies demonstrated direct relationships

between river stages and shallow groundwater levels. Ongoing litigation between several groups continue to muddy the waters.

Neider Farms in Bates County uses an animal waste management system that distributes dairy cattle effluent over a large soil-plant filtration field.
DNR photo by Scott Myers



GSRAD also partners with the department's Public Drinking Water Program and the U.S. Geological Survey in providing stream gauging information. This data is useful for surface water irrigators, future water rights allocations, drought assessment, flood crest predictions and flood evacuation plans on the Missouri and Mississippi rivers.

The Missouri Department of Natural Resources' mission is clear – "... to preserve, protect, restore and enhance Missouri's natural, cultural and energy resources ... and (ensure their) responsible use for present and future generations." No other entity in the state has such a solid stake in that mandate than do the agricultural producers of our state.

And no other state can boast of such a diverse collection of successful agricultural operations and businesses. From the smallest private farm to the largest corporate livestock operation, a healthy and diverse natural resource environment is essential to support and sustain agri-business in Missouri.

Scott B. Totten is director of the department's [Water Protection and Soil Conservation Division](#).



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The Price of Power **Energy Market Fuels Cost at Pump**

by Kerry Cordray

It seems to happen so often in the past few years: Cruising into the pump at the neighborhood gas station, you idly glance at the price board and are momentarily startled to see that the price of a gallon has jumped by a nickel, a dime or even more since you noticed it yesterday. But your tank is nearly empty, and you've got to get where you need to go for the next few days, so what can you do but grumble to yourself as you fill up? Sometimes it's the other way around – prices that zoomed skyward a few weeks ago are settling down now, and you feel like you scored a bargain today as you pay the cashier.

But in either situation, as you drive away, in the back of your mind you wonder: Did demand go down? Did supplies go up? Is something new going on today in the Middle East? Prices go up or down so suddenly – what changed? When energy costs leap or sag sharply, phones at the Missouri Department of Natural Resources' [Energy Center](#) start ringing. Citizens and reporters trying to make sense of the local situation ask for simple explanations of the ups and downs of the market. Often an answer is easily at hand, such as a sudden rise in the price of Mideast crude oil prompted by war or international tension, but sometimes the reason is not evident.

"Much like the stock market, the energy

marketplace can be a very hard place to explain or predict," said Anita Randolph, director of the Energy Center, part of the department's Outreach and Assistance Center. "Multiple factors converge to create the price we see at the pump. Some factors may have arisen weeks earlier, so it's often difficult to see the connection with the pump price you pay on any given day."

The pre-tax factors that add up to the full price of a gallon of fuel include:

- The costs of crude oil
- Transportation from the oil field to the product refinery
- Processing raw material into refined petroleum products
- Transportation from the refinery to the consuming market
- Storage, transportation and distribution between the market distribution center and the retailer
- Market conditions at each stage along the way, and in the local market

In addition, total motor fuel taxes account for 35.4 cents of the price of each gallon of gas sold in Missouri. The federal share is 18.4 cents per gallon. Only seven other states have a lower state gasoline tax than Missouri's 17 cents per gallon.

The price of crude oil is the single largest factor in the price of gasoline, and the volatility of crude oil prices is the most common cause of the price swings we see at the pump. Determined by worldwide supply and demand, oil prices are set through trading on international markets, where the Organization of Petroleum Exporting Countries (OPEC) exerts a considerable influence on the marketplace. Geopolitical events and uncertainties also have major effects on the market, such as the build-up toward a war, or the worker strike that paralyzed the Venezuelan oil industry in early 2003.

The price of a barrel of crude oil has been the driving factor in most of the largest price run-ups in the last 12 years, according to studies by the National Petroleum Council.



"The fundamental factors Δ crude oil prices and gasoline production costs Δ begin to pass through to the marketplace within two to four weeks. Depending on the current market conditions, they may even take four to eight weeks to reach their full effects," said Doug MacIntyre, oil market analyst for the Energy Information Administration (EIA), a statistical agency of the U.S Department of Energy.

MacIntyre noted that while the basic costs of crude oil and producing, distributing and marketing fuel are significant, they only tell part of the story of how the final price at the pump is arrived upon. "Crude oil, gasoline, natural gas and other energy sources are commodities, traded and exchanged like stocks and bonds, pork bellies and platinum. In addition to the costs of raw material and production, the market forces unleashed by speculation and trading also can have significant near-term effects on the price of gasoline."

Two types of energy traders affect the market most, according to Bill O'Grady, director of futures research for the St. Louis investment firm A.G. Edwards and Sons. "Oil companies buy to hedge prices and keep their companies' costs and profits stable, while independent speculators are buying and selling in the marketplace simply to make money."



Oil and gasoline are sold in a variety of contract arrangements and in bulk cash purchases known in the trade as "spot" transactions. Millions of gallons of gasoline, diesel fuel, heating oil, jet fuel, propane, and other oil products are bought and sold each day on the "spot" market. These transactions typically take place at the leading oil refining, barge and pipeline centers in the United States.

If all this were not enough to confuse the average motorist trying to make sense of price changes at the local pumps, just add the whole concept of futures trading. "The price that the major wholesale buyer pays today for a shipment of oil or gasoline may have been set as much as 18 months ago by buyers and sellers who made a deal on the trading floors of the New York Mercantile Exchange," said O'Grady.

While spot transactions involve the trade of physical barrels of oil, a futures contract is a promise to deliver a given quantity of a commodity at a specified place, price and time in the future. In practice, oil is seldom actually delivered under a futures contract. The futures market functions as a financial mechanism that spreads the availability of price information and distributes risk among buyers and sellers.

Traders watch and compare a wide variety of clues about supply and demand as they

decide what to bid or accept for the millions of gallons traded every day.

O'Grady said that the market responds to international and geopolitical events, current inventories and annual inventory averages, weather, economic trends, and seasonal changes such as a refinery's annual switchover to different gasoline formulas required for various cities to meet their seasonal clean-air requirements.



Large, above-ground storage tanks hold various fuel grades. Some, such as these at Jefferson City Oil Co., also store and distribute ethanol. DNR photo by Scott Myers

These spot and futures market prices, as well as other market factors, figure into the gasoline price the major oil companies decide to charge at their own company-owned stations, or what they may charge other wholesale "jobbers" who distribute gasoline to their own stations or independent retailers. Once a refinery manufactures gasoline, the fuel may be shipped directly to company-owned retail stores, sold directly to a wholesale distributor, or shipped via pipeline or barge to a loading terminal, known in the industry as a "rack." Although crude oil prices are the most common cause of major price swings, a regional supply disruption, such as a refinery outage or a pipeline break, also can be the cause of a sudden and dramatic surge.

"The major price run-up that Missouri and the Midwest saw in the spring of 2001 was largely a market response to a refinery fire that shut down Citgo's LeMont refinery near Chicago," said John Buchanan, a planner in the department's Energy Center. "The price surge

here in the Midwest also created a ripple effect that resulted in higher gasoline prices nationwide. These kinds of disruptions have had greater impacts on the market over the past 20 years, as fewer United States refineries are operating to meet domestic demand for fuel that continues to increase each year."

A terminal may sell gasoline at a contracted price with a larger buyer, or sell at a "rack price," the day's per-gallon price charged for a load to any independent buyer. Distributors make most of their bulk fuel purchases at more than 25 rack locations in Missouri and nearby states.

"The rack price for a fuel on any given day may vary quite a bit from one rack location to another," said Ivan Wallace of Home Service Oil, a wholesale fuel distributor headquartered in Barnhart, near St. Louis. "While we may have contracts for a certain amount of volume from our major brand suppliers, depending on prices we may decide to pick up other products we need from any one of a half-dozen terminals or

pipelines in the region."

Wallace noted that selecting from a variety of racks can help the distributor control costs. "But the rack price the wholesaler is charged, and therefore the price he must charge a retailer for a tanker load, can reflect the same kinds of sudden or dramatic changes you see at the pump," said Wallace. The wholesale prices include some amount for profit to the wholesaler and the cost of trucking the fuel to the retailer. At the end of the long chain of transactions that ends in the final price of a gallon of gas, the retailer has his own set of price decisions to make. "Station owners are continually weighing their overall operating costs, the cost of the gasoline stocks they already have, the current costs of replacing their stock, and the prices being charged by other stations that are the local competition," said Ronald Leone, vice-president of the Missouri Petroleum Marketers and Convenience Store Association. "Of all the links in the marketing chain, the retailers have the least control over the price of a gallon of fuel, yet they catch the most heat from the consumer when there's a major price increase," Leone added.

Still, how and when retailers decide to change prices depends on some local judgement. "Many times the retailer won't increase his retail price until another station 'leads' the move," said retailer and fuel transporter Tom Kolb, co-owner of Jefferson City Oil Company. "Often that doesn't happen until an increasing wholesale price reaches upward to equal some local station's retail price."

Sometimes the competition may even leave some stations in the position of selling at a loss under the currently prevailing local price, a situation forbidden by state law except when the station is responding to a local competitor whose costs are still lower than their price. "In practice, most retail gas stations make an average profit of anywhere from five to eight cents per gallon of fuel most of the time but that profit can often be much less," Kolb said. With all of the market factors at play, answering Missourians' inquiries during a time of gasoline price volatility can be a real challenge. "We rely a great deal on information from federal experts and industry sources," said Randolph. "But sometimes, even they aren't able to predict what will happen next, or fully explain the reasons for what's happening at the time.



"About the only thing for certain is that if the current trend for longer commutes in less fuel-efficient cars goes on unchecked, a trip to the gas station will continue to be

a periodic source of surprise."

Kerry Cordray is division information officer for the [Outreach and Assistance Center](#), which includes the department's Missouri [Energy Center](#).



Resource Honor Roll

Sherry Kempf Designing Our Future



Sherry Kempf

As a 10-year veteran of the State of Missouri's Office of Administration, Division of Design and Construction, Sherry Kempf knows just how complicated building projects can be. Whether she is designing plans for a new roof or a building to put under it, people will be standing in line to offer input toward their dreams for a given final project. Then along came the Missouri Department of Natural Resources. The department's central office staff were sprawled all around the state capital and located in various buildings - some old, some new, some hot, some cold, some attractive, some - let's just say looks aren't everything. The situation demanded some operational efficiencies. Designing a central office, however, was going to require more than just space. With the funds already secured, the department wanted the most for its money in terms of sustainability and efficiency.

Berkebile, Nelson, Immenschuh and McDowell (BNIM), the award-winning firm that was awarded the design contract, needed to work with a project manager familiar with the Jefferson City area, state government operations in general, and local and state building requirements specifically. Kempf was selected by Randy Allen, Director of the Division of Design and Construction. Everyone involved knew the task would be scrutinized and tedious. The criteria established just to find an approved site was daunting, but Kempf persevered through challenges, changes and mountains of suggestions from planning groups. The prime contract bidders agreed that the plans developed by BNIM under Kempf's project management were exceptionally well done.

Kempf, who possesses a degree in Human Environmental Design, admits the technology of sustainable design is different from the normal building projects she has worked on. But she never lost her enthusiasm for the job, nor her team-building focus. "Project management is really is all about communication and bringing all partners in the project together to form a team so that you can meet the goals of everyone on the project," Kempf said.

Jeff Staake, Department of Natural Resources deputy director, ardently reminded all involved that just as important as the dire need for the facility, was the obligation for the department to set an example that faithfully respected its own mission. The realization of his vision would require Kempf to carry that torch of responsibility for the length of the run. "Sherry exhibited great foresight and commitment to the project and carried our enthusiasm through to the completion of the design phase. She sustained a team ethic and her communication skills were exemplary," Staake said.

The 120,000 square-foot facility is scheduled for completion in September 2004. It will be a linchpin between the Jefferson City Correctional Center property redevelopment project and several acres of green space near the bluffs of the Missouri River. Kempf's contributions, now complete, will forever be remembered for not only her critical role in pulling the project together, but for the contribution her efforts will make toward the future of other sustainable, energy-efficient state buildings.

"I believe we have accomplished what we set out to do, and that hopefully, in the future, other buildings will incorporate some of these new design concepts. Having grown up in the country around Boonville, I always had a deep love for nature and the environment. I am proud to say that I worked on this building. It was challenging, but worth the effort," Kempf said.

In her spare time, Kempf likes to, among other things, spend time in the garden with her husband and daughter. Here's betting that the Kempf's garden is the greenest one in the neighborhood.

Dave Mosby

A Healthy Commitment



Dave Mosby

For Dave Mosby, lead is a very heavy subject indeed. An environmental specialist in the Missouri Department of Natural Resources' Air and Land Protection Division, Mosby previously was chosen as both the department's employee of the month for May 2002 and Missouri State Employee of the Month for September 2002. Working as a project manager out of the Hazardous Waste Program's Superfund Section, he has devoted much of his time improving the health of children in Missouri. Elevated blood-lead levels in children, infants and pregnant women, has been proven to cause several serious health problems, among them lifelong learning disabilities, anemia, brain damage and stunted growth.

Following a lengthy, late and contentious public meeting in Herculaneum one night, Mosby listened to Jack and Leslie Warden describe the transport of lead from the Doe Run Company smelter as trucks traveled the streets at all hours of the day and night. Mosby had heard parents discussing various ailments in their children, and decided to

accompany the Wardens with a handheld testing device. "As soon as I saw that dust up close, I knew it was 'hot.' It had a metallic luster that I could see from the street light," he said.

Mosby helped the department and the Environmental Protection Agency (EPA) negotiate an agreement that led to changes in Doe Run's transportation of materials at the smelter. He also coordinated the investigation and cleanup efforts at the Oronogo-Duenweg site in Jasper County. There, Mosby coordinated the replacement of lead-contaminated soil in 2,600 yards. He also frequently served as the point of contact for the public and represented the Department of Natural Resources at numerous public meetings. His professional but empathetic approach has earned the public's trust.

Mosby indicates that things are turning around in Herculaneum. "The number of kids with elevated blood-lead is way down, and air emissions have been under the standard for a year," he said.

Mosby, a resident of Hartsburg, credits the cooperation of several state and federal agencies, including the Doe Run Company itself, with the progress that has been made to date. He acknowledges that much remains to be done related to yard dust, waterway contamination and other ongoing lead issues in the town. "I think the bigger challenge will be establishing long-term measures that will keep the lead under control ... for generations to come," he said.

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Resources to Explore

Harry S Truman Birthplace State Historic Site



by Jennifer Sieg

This simple, frame house is the centerpiece of the Harry S Truman Birthplace State Historic Site.

“Harry Truman, retired farmer,” was the way Harry S Truman signed the guest book at the dedication of Harry S Truman Birthplace State Historic Site in Lamar in 1959.

Although Missourians know Harry S Truman as the only person from the state to be elected to the presidency of the United States, Truman modestly signed the guest book at the dedication in a manner reflective of his humble life.

Even with the most humble beginnings, true greatness shines through. Truman's life began in the rural Missouri town of Lamar. Born the son of a farmer, long, hard, tedious hours of farm work helped shape his character. This character and a will to fight the odds were instilled in him at a young age and stayed with him throughout his

life. He endeared himself to the citizens of the state through his genuine country manners and down-to-earth sensibility. All of these attributes contributed to him becoming the 33rd President of the United States.

Truman's roots were firmly planted in Missouri. Both sets of grandparents moved to a place called Westport Landing & later renamed Kansas City & in the 1840s. His parents, John Anderson Truman and Martha Ellen Young, were born on farms in that area. After John and Martha were married, they moved to Lamar, where they continued farming and operating their livestock business.



Visitors can see the small bedroom where Truman was born on May 8, 1884. DNR photo by Scott Myers

In 1882, the Trumans purchased a 20-by-28-foot house in Lamar for \$685. Two years later, on May 8, 1884, Harry S Truman was born in the downstairs southwest bedroom of the house. In lieu of a middle name, his mother chose the middle initial "S" to please both grandfathers & Solomon Young and Shippe Truman. To celebrate the birth of his first child, John Truman proudly planted an Austrian pine tree at the southeast corner of the house, where it thrives today, and nailed a mule shoe over the front door for luck.

The Trumans remained in Lamar until Harry was 11 months old, at which time they moved back to the Kansas City area, settling in Independence in 1890. It was there that Harry began his formal education, met his childhood sweetheart and future wife, Elizabeth Virginia (Bess) Wallace, and graduated from Independence High School in 1901.

With the family experiencing hard times, college was not an option for Truman. He entered into the work force to help keep his brother and sister in school. He worked as a timekeeper for a railroad contractor, in the mail room of The Kansas City Star and in two banks. Beginning in 1906, he spent the next 11 years helping his parents run the family farm near Grandview, leaving in 1917 to join the U.S. Army in World War I.

Truman was shipped to France and it was there, under the most trying circumstances, that he displayed his extraordinary leadership ability. He was promoted to commander of Battery D, 129th Field Artillery. His detachment was engaged in some of the fiercest combat action of the war in the Battle of Meuse-Argonne.

When the war ended, the first item on Truman's agenda was to marry his childhood sweetheart, "Bess" Wallace. They were married in 1919 in Independence, where

Truman and a partner opened a men's clothing store. The business failed, however, in 1922, and Truman spent more than a decade paying off his debts. Truman then turned to local politics with the encouragement of one of his fellow officers, Lt. James Pendergast, the nephew of well-known political boss Tom Pendergast.

Truman's first job on the political scene was as eastern judge of the Jackson County Court. From 1926 to 1934, he served as presiding judge to the court. He was then elected to the U.S. Senate in 1934 and re-elected in 1940. His work on a Senate committee that was created to oversee military expenditures led President Franklin D. Roosevelt to select Truman as his 1944 Democratic running mate.

Truman reportedly drew the largest crowd in Barton County's history when he returned to Lamar for the first time to deliver his nomination acceptance speech. As expected, the Roosevelt-Truman ticket won in 1944. Only 82 days after the inauguration, Roosevelt died of a massive stroke, making Harry S Truman the nation's 33rd president.

His list of White House accomplishments and controversies is legendary. He ended World War II by ordering the atomic bomb to be dropped on Japan. He enlisted Gen. Douglas MacArthur, a World War II hero, to "police" Korea during the Korean War, and then fired him for his insubordination. He integrated the U.S. military at a time when segregation ruled the land. While derailing Sen. Joseph McCarthy's anti-Communist witch hunt, he prevented a railroad and steel mill strike by threatening to nationalize their operations. Truman's last controversial presidential act was his announcement that he would not seek his party's nomination for a second full term as president in 1952.

In 1953, Truman and his wife returned to Independence, where he wrote his two-volume memoirs and worked daily for many years at the Harry S Truman Library and Museum.

The United Auto Workers of America purchased Truman's birthplace in 1957, restored it and donated it to the state. In 1959, Truman made his second visit to Lamar when the site was dedicated. "They don't do this for a former president until he's been dead 50 years. I feel like I've been buried and dug up while I'm still alive, and I'm glad they've done it to me today," said Truman at the ceremony.

Truman died on Dec. 26, 1972, at the age of 88 in Independence.

Today, free tours (per Truman's request) are given daily of the home, which is



This memorial was erected at the historic site by the American Legion in 1984 to commemorate Truman's 100th birthday. DNR photo by Scott Myers

operated by the Missouri Department of Natural Resources. The one and one-half story house, built around 1881, is listed on the National Register of Historic Places and has been decorated with furnishings reflective of the period of the Truman's occupancy. The home is heated and air conditioned for today's visitors and had neither electricity nor plumbing during the Truman's stay. Interpretation of an outdoor smokehouse and hand-dug well are also part of the tour. The more than 2,500 school children that visit the site each year are usually fascinated with the simple way of life.

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The site caters to walk-ins, bus tours and school groups. Bus tours and school groups should contact the site in advance of their visit.

The historic site staff offers programs not only on Truman's life, but also on Missouri history, the Civil War, Osage Indians and related themes. Special events held each year include a celebration of Truman's birthday in May, Lamar's Heritage Days in June and a Christmas open house in December.

For more information about [Harry S Truman Birthplace State Historic Site](#), contact the site directly at (417) 682-2279 or the Department of Natural Resources toll free at 1-800-334-6946 (voice) or 1-800-379-2419 (Telecommunications Device for the Deaf) or visit the Division of State Parks Web site at [www.mostateparks.com].

Jennifer Sieg is a public information specialist with the Missouri Department of Natural Resources' Division of State Parks.

MISSOURI resources

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Starting in the 1930s, the U.S. Department of Agriculture (USDA) established erosion stations around the country to systematically evaluate the effects of tillage practices and rainfall on erosion of different soil types. One of the first was the Bethany Soil Erosion Experiment Station, established by the University of Missouri and the USDA near the north-central

Missouri town of Bethany. Data gathered from the erosion plots at Bethany, along with data from other stations, quantified the serious problem of erosion and helped develop erosion-prevention practices that are essential to modern agriculture. In this picture, taken by the university photographer, agricultural engineer C.K. Shed, front left, and two assistants prepare dynamite to blast a stump from a test plot. The photograph is from the Bethany Experiment Station Collection at the University Archives, the University of Missouri-Columbia.

Send your photo to "Time Exposures," c/o [Missouri Resources](#), P.O. Box 176, Jefferson City, MO 65102-0176. All pictures will be returned via insured mail. Pre-1970 environmental and natural resource photos from Missouri will be considered. Please try to include the date and location of the picture, a brief description and any related historic details that might be of interest to our readers.



Teacher's Notebook

Career Connection Working Where People Play

by Jennifer Sieg



Debbie Newby
DNR photo by Scott Myers

Enjoying the outdoors and Missouri's natural resources is usually on the agenda when people are planning a vacation or a weekend of rest and relaxation. However, for some Missouri Department of Natural Resources employees, like Debbie Newby, these things show up on their daily work agendas.

For Newby, parks superintendent at [Finger Lakes State Park](#), working outdoors in a recreational setting has been a lifelong goal. "I love having the ability to add being outside, hiking trails and enjoying nature to my work schedule," said Newby. Her interest in the outdoors started as a child attending and later

working at a summer camp, where she learned a variety of outdoor skills. Today, working outside maintaining the park's natural resources and providing a unique recreational sport is a part of Newby's job as natural resource manager at the facility. Newby manages one of only two Missouri state parks that offer trails and riding areas for all-terrain vehicles.

Working outdoors, however, is only a part of Newby's job. On a day-to-day basis, Newby works closely with the park's maintenance and clerical staff, does monthly reports on park activities, deals with budget issues and takes care of many other concerns as they arise. She also takes time to visit with park guests, verifies with the campground hosts, who volunteer their time in the park, that everything is going smoothly in the campground. Newby also works closely with organizations that host motocross races in the park. "I love the variety in the day-to-day activities," says Newby. "I'm not confined to a desk and have a lot of flexibility."

Being in charge of a facility and making major decisions is also something Newby enjoys about her job. Knowing that she plays a big role in making the park function and run smoothly is a rewarding experience. Newby claims that a benefit to the job is the "great support system" provided by staff at the department's Division of State Parks' central office.

"If I have a question or problem, there is always someone in central office with an

answer or solution," says Newby. Newby feels that through her job, she truly serves the citizens of Missouri. She helps maintain the natural resources of the park and keeps the park clean and in good shape for all visitors to enjoy. She makes herself available to answer visitor questions and deal with concerns.

Although enjoying the outdoors is a must for the job, people interested in a career in this field also need a variety of other skills. Applicants must have the ability to juggle a number of tasks at one time. Since the job requires interaction with the public, good and bad, and supervises numerous people,

being a "people person" is very helpful. Newby, with a bachelor's degree in recreation administration, served as an assistant park superintendent at [Rock Bridge Memorial State Park](#) for three years prior to accepting her current superintendent position at Finger Lakes State Park.



Newby participates in a kayak race on one of Finger Lakes State Park's strip pits. DNR photo by Scott Myers



A youngster rides his four-wheeler on a trail reserved for smaller kids. The popular park is well-known for its multiple ATV and dirt bike trails. DNR file photo

General qualifications for a natural resource manager include four years of professional experience in parks and recreation, park or historic site operation, cultural resource preservation, natural resource management, natural resource promotion and education or closely related areas. Successful candidates also must possess a bachelor's degree in parks and recreation, natural sciences, history, art or music history, anthropology, museum studies, park management, wildlife management, forestry, public relations, marketing, business or public administration or a closely related field.

Finger Lakes State Park is one of 36 state parks that are run by natural resource managers. The Missouri state park system preserves and protects a large variety of landscapes and natural resources and offers various recreational options, making each park a unique

management experience.

There are three levels, or bands, of positions available under this job title, providing ample room for advancement. Natural resources managers also serve the Department of Natural Resources as historic site administrators, program and district managers, natural and cultural resource professionals, and interpretation, marketing and special event coordinators. For more information about the department's opportunities in this field, call the department's [Outreach and Assistance Center](#) at 1-800-361-4827 and ask for the [Human Resources Program](#).

Jennifer Sieg is a public information specialist with the department's [Division of State Parks](#).